



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/073,494	05/06/1998	PAI-HUNG PAN	2915.1US(96-	9834

7590 05/16/2003

JOSEPH A WALKOWSKI
TRASK BRITT & ROSSA
PO BOX 2550
SALT LAKE CITY, UT 84110

EXAMINER

VU, HUNG K

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 05/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/073,494

Applicant(s)

PAN ET AL.

Examiner

Hung K. Vu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 24 February 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 23-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (PN 5,472,896, of record). Note Col. 4, lines 23-50 and Figures 1e and 3f of Chen et al..

With regard to claim 23, Chen et al. discloses an operable gate stack on a silicon substrate having a dielectric layer thereover, the dielectric layer being substantially devoid of pitting, the operable gate stack including a non-crystalline metallic silicide film (16) and a dielectric cap (22) on the non-crystalline metallic silicide film.

With regard to claim 24, Chen et al. discloses an operable gate stack on a silicon substrate having a dielectric layer thereover, the dielectric layer being substantially devoid of pitting, the operable gate stack, including an amorphous metallic silicide film (16) wherein the metallic silicide film is substantially devoid of silicon clusters, a dielectric cap (22) on the non-crystalline metallic silicide film. Note that because the metallic silicide film is in an amorphous state, it is inherent that it is substantially devoid of silicon clusters.

Art Unit: 2811

With regard to claim 25, Chen et al. discloses an operable gate stack on a silicon substrate (10) having a dielectric layer (12) thereover, the dielectric layer being substantially devoid of pitting, the operable gate stack comprising,

- a polysilicon layer (14) disposed over the dielectric layer;
- a non-crystalline metallic silicide film (16) disposed over the polysilicon layer;
- a dielectric cap (22) on the non-crystalline metallic silicide film.

With regard to claim 26, Chen et al. discloses a gate stack structure comprising an operable gate stack on a dielectric layer (12), over a silicon substrate (10), wherein the dielectric layer is substantially devoid of pitting, the operable gate stack comprising a metallic silicide film (16) and a dielectric cap (22) on the metallic silicide film. Note that because a metallic silicide film (16) is in an amorphous state, it is inherent that the dielectric layer is substantially devoid of pitting.

With regard to claim 27, Chen et al. discloses the metallic silicide film comprises a non-crystalline metallic silicide film (16).

With regard to claim 28, Chen et al. discloses the metallic silicide film comprises an amorphous metallic silicide film (16) substantially devoid of silicon clusters. Note that because the metallic silicide film is in an amorphous state, it is inherent that it is substantially devoid of silicon clusters.

Art Unit: 2811

With regard to claim 29, Chen et al. discloses a semiconductor device comprising at least one gate stack formed on a silicon substrate having a dielectric layer thereover, the dielectric layer being substantially devoid of pitting, the at least one gate stack comprising a non-crystalline metallic silicide film (16) and a dielectric cap (22) on the non-crystalline metallic silicide film.

With regard to claim 30, Chen et al. discloses the at least one gate stack further comprising,
a polysilicon layer (14) disposed over the dielectric layer,
the non-crystalline metallic silicide film (16) being disposed over the polysilicon layer.

With regard to claim 31, Chen et al. discloses a semiconductor device comprising at least one gate stack structure on a dielectric layer (12), over a silicon substrate (10), wherein the dielectric layer is substantially devoid of pitting, the at least one gate stack structure comprising a metallic silicide film (16) and a dielectric cap (22) on the metallic silicide film. Note that because a metallic silicide film (16) is in an amorphous state, it is inherent that the dielectric layer is substantially devoid of pitting.

With regard to claim 32, Chen et al. discloses the metallic silicide film comprises a non-crystalline metallic silicide film (16).

With regard to claim 33, Chen et al. discloses the metallic silicide film comprises an amorphous metallic silicide film (16) substantially devoid of silicon clusters. Note that because the metallic

Art Unit: 2811

silicide film is in an amorphous state, it is inherent that it is substantially devoid of silicon clusters.

Response to Arguments

2. Applicant's arguments filed 02/24/03 have been fully considered but they are not persuasive.

It is argued, at pages 6-10 of the Remarks, that Chen et al. does not disclose a dielectric cap on the non-crystalline metallic silicide film. This argument is not convincing because Chen et al. discloses, as shown in Figures 3f and 4f, a dielectric cap (22) on the non-crystalline metallic silicide film (16).

It is argued, at pages 7-10 of the Remarks, that Chen et al. does not disclose the dielectric layer substantially devoid of pitting. This argument is not convincing because Chen et al. discloses, at Col. 4, lines 22-28, that many steps which are described with reference to Figures 1a – 1f are also used in Figures 3a – 3f. In Col. 1, line 57 – Col. 2, line 13, Chen et al. discloses forming a dielectric layer (12), a gate layer (14) and non-crystalline metallic silicide layer (16) first, then etching these layers to form a gate electrode structure. Since the metallic silicide layer is in an amorphous state, it is inherent that the dielectric layer is substantially devoid of pitting.

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2811

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

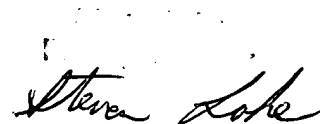
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-4:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

May 12, 2003

A handwritten signature in cursive script, appearing to read "Steven Lake".